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Compilation of Pass Rates vs. Attempts for App VIII Qualifications for Piping, DM Welds and Weld Overlay and RPV

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Overview

- Things to consider
  - The piping data is since 1/2/2011 (past 17 months)
    - RPV data is from the beginning
  - Includes the FastTrack students (piping only)
    - Success rate
      - 6/14 for Austenitic
      - 7/14 for Ferritic
    - 12 from CPCC and 2 from Ridgewater
  - IGSCC Requal with instruction
    - 3 days of classroom/lab with a practice practical
  - All Phased-array DSM included depth sizing (TWS)
    - Most use the generic procedures

Manual: Similar Piping Welds – Detection & Length

Qualification (Ferritic)	Attempts						Comments
	First		Second		Third		
	Pass	Fail	Pass	Fail	Pass	Fail	
Conventional	15	13	7	0	0	0	
Phased Array	11	8	5	1	1	0	

Qualification (Austenitic)	Attempts						Comments
	First		Second		Third		
	Pass	Fail	Pass	Fail	Pass	Fail	
Conventional	12	21	7	5	2	2	1 4^{th} & 1 5^{th} attempt
Phased Array	13	6	3	3	0	1	

Manual: IGSCC Requalification (Supplement 2)

Qualification (Austenitic w/IGSCC)	Attempts						Comments
	First		Second		Third		
	Pass	Fail	Pass	Fail	Pass	Fail	
Conventional	14	12	2	5	2	2	
Conv w/Guided Practice & Instruction	8	3	0	1	0	1	Included above
Phased Array	0	1	1	0	0	0	

Manual: Similar Piping Welds – Through-wall Sizing

Qualification (Supplements 2/12)	Attempts						Comments
	First		Second		Third		
	Pass	Fail	Pass	Fail	Pass	Fail	
Conventional	8	4	2	2	0	0	
Phased Array	6	1	0	1	0	0	

Manual: Dissimilar Metal Piping Welds

Qualifications (Supplement 10)	Attempts						Comments
	First		Second		Third		
	Pass	Fail	Pass	Fail	Pass	Fail	
Conventional	1	1	1	0	0	0	
Phased Array	4	3	1	2*	0	2*	*TWS Only

Manual - Weld Overlay Repair

Qualification (Supplement 11)	Attempts						Comments
	First		Second		Third		
	Pass	Fail	Pass	Fail	Pass	Fail	
Conventional	6	1	0	1	0	0	
Phased Array	9	1	1	0	0	0	

Automated Qualifications

Piping Qualifications (Aust/Ferr/DSM/WOR)	Attempts						Comments
	First		Second		Third		
	Pass	Fail	Pass	Fail	Pass	Fail	
Conventional (Det/Len)	2	0	0	0	0	0	
Phased Array (Det/Len)	4	6	3	3	2	0	All IGSCC Requals
Conventional (TWS)	0	0	0	0	0	0	
Phased Array (TWS)	8	1	0	0	0	0	All initial quals
WOR	0	0	0	0	0	0	(Conventional & PA)
Conventional (DSM)	0	0	0	0	0	2	Prior attempts in 2010, No PA

Cause for Failure

Manual Qualifications 1/2011-5/2012	Causes			Comments
	Missed Detection	False Calls	Missed Far Side	
Ferritic	9	8	N/A	
Austenitic	34	13	19	
Austenitic w/IGSCC	20	13	12	
DSM	2	1	N/A	
WOR	3	0	N/A	

- Failure could result from more than one cause
- Missed detections include missed far sided flaws
  - IGSCC 12/20 failed due to missing far sided flaws
- Most PA WOR failures are due to mischaracterization
  - Call ISI a PSI (counted as a missed detection)

RPV Pass Rates – Manual (non-encoded)

MANUAL	# Candid. 1st attm.	# Passed 1st attm.	# Candid. 2nd attm.	# Passed 2nd attm.	# Candid. 3rd attm.	# Passed 3rd attm.	%Pass rate 1st attm.	%Pass rate 2nd attm.	%Pass rate 3rd attm.
Shell (inner 15%) OD (Detection)	132	36	80	38	32	18	27.3	47.5	56.3
Shell (inner 15%) OD (Length Sizing)	68	62	6	5	1	1	91.2	83.3	100.0
Shell (inner 15%) OD (Depth Sizing)	68	44	24	20	3	2	64.7	83.3	66.7
Shell (outer 85%) OD (Detection)	126	71	49	26	19	15	56.3	53.1	78.9
Shell (outer 85%) OD (Length Sizing)	68	66	2	1	1	1	97.1	50.0	100.0
Shell (outer 85%) OD (Depth Sizing)	68	60	8	6	2	2	88.2	75.0	100.0
Noz-to-shell and IR OD (Detection)	18	14	4	4	0	0	77.8	100.0	#DIV/0!
Noz-to-shell and IR OD (Depth Sizing)	6	0	4	2	2	2	0.0	50.0	100.0

RPV Automated (encoded)

AUTOMATED		# Candid. 1st attm.	# Passed 1st attm.	# Candid. 2nd attm.	# Passed 2nd attm.	# Candid. 3rd attm.	# Passed 3rd attm.	% Pass rate 1st attm.	%Pass rate 2nd attm.	%Pass rate 3rd attm.
Shell (inner 15%) OD	(Detection)	110	46	40	23	17	9	41.8	57.5	52.9
Shell (inner 15%) OD	(Length Sizing)	69	60	9	7	5	4	87.0	77.8	80.0
Shell (inner 15%) OD	(Depth Sizing)	69	39	30	11	19	14	56.5	36.7	73.7
Shell (outer 85%) OD	(Detection)	110	74	23	15	6	5	67.3	65.2	83.3
Shell (outer 85%) OD	(Length Sizing)	84	68	16	11	5	4	81.0	68.8	80.0
Shell (outer 85%) OD	(Depth Sizing)	84	41	43	27	16	8	48.8	62.8	50.0
Shell (inner 15%) ID	(Detection)	149	105	40	35	5	4	70.5	87.5	80.0
Shell (inner 15%) ID	(Length Sizing)	114	105	7	5	2	1	92.1	71.4	50.0
Shell (inner 15%) ID	(Depth Sizing)	114	78	36	26	8	5	68.4	72.2	62.5
Shell (outer 85%) ID	(Detection)	153	87	62	37	20	13	56.9	59.7	65.0
Shell (outer 85%) ID	(Length Sizing)	111	81	30	26	2	2	73.0	86.7	100.0
Shell (outer 85%) ID	(Depth Sizing)	111	49	62	33	23	4	44.1	53.2	17.4
Noz- to-shell and IR OD	(Detection)	23	10	13	6	10	4	43.5	46.2	40.0
Noz-to-shell and IR OD	(Depth Sizing)	19	8	5	3	0	0	42.1	60.0	#DIV/0!
Noz-to-shell and IR ID	(Detection)	46	19	23	14	9	4	41.3	60.9	44.4
Noz-to-shell and IR ID	(Length Sizing)	5	2	3	3	0	0	40.0	100.0	#DIV/0!
Noz-to-shell and IR ID	(Depth Sizing)	6	2	4	2	2	1	33.3	50.0	50.0